

What is claimed is:

1. An RF module comprising:

a waveguide having an area which is surrounded by a pair of ground electrodes and a conductor for making electrical connection between the pair of ground electrodes, the pair of ground electrodes being provided so as to face each other, and in which electromagnetic waves in the TE mode can propagate and a one-wavelength resonator is formed; and

a pair of output lines connected to portions corresponding to half-wavelength resonance regions of the one-wavelength resonator in one of the pair of ground electrodes.

2. The RF module according to claim 1, wherein the pair of output lines is formed so that electromagnetic waves in the TEM mode can propagate.

3. The RF module according to claim 1, comprising:

a half-wavelength resonator formed inside the waveguide and coupled to the one-wavelength resonator; and

an input line which is connected to a portion corresponding to the half-wavelength resonator in one of the pair of ground electrodes and through which electromagnetic waves in the TEM mode can be input as electromagnetic waves in the TE mode to the

half-wavelength resonator.

4. The RF module according to claim 3, wherein the half-wavelength resonator and the one-wavelength resonator are coupled to each other via a coupling window.
5. The RF module according to claim 3, further comprising at least one another resonator which is formed between the half-wavelength resonator and the one-wavelength resonator and coupled to both of the resonators via a coupling window.
6. The RF module according to claim 1, further comprising:
  - another one-wavelength resonator formed inside the waveguide and coupled to the one-wavelength resonator; and
  - a pair of input lines which are connected to portions corresponding to half-wavelength resonance regions of the another one-wavelength resonator in one of the pair of ground electrodes and through which electromagnetic waves in the TEM mode can be input as electromagnetic waves in the TE mode to the another one-wavelength resonator.
7. The RF module according to claim 6, wherein the another one-wavelength resonator and the one-wavelength resonator are

coupled to each other via a coupling window.

8. The RF module according to claim 6, further comprising at least one resonator formed between the another one-wavelength resonator and the one-wavelength resonator and coupled to both of the resonators via a coupling window.

9. The RF module according to claim 3, wherein the input line is any one of a strip line, a microstrip line, and a coplanar line.

10. The RF module according to claim 1, wherein the output line is any one of a strip line, a microstrip line, and a coplanar line.